

TENT COOPERATION TRE Y

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing: 23 March 2000 (23.03.00)	
International application No.: PCT/GB99/03085	Applicant's or agent's file reference: FP-08-0932
International filing date: 14 September 1999 (14.09.99)	Priority date: 15 September 1998 (15.09.98)
Applicant: JUBB, Gary, Anthony et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International preliminary Examining Authority on:  
28 January 2000 (28.01.00)

☐ in a notice effecting later election filed with the International Bureau on:  
\_\_\_\_\_

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer:  J. Zahra Telephone No.: (41-22) 338.83.38
-----------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------

## TENT COOPERATION TRE Y

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

PHILLIPS & LEIGH  
5 Pemberton Row  
London EC4A 3BA  
ROYAUME-UNI

Date of mailing (day/month/year) 12 April 2000 (12.04.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference FP-08-0932	
International application No. PCT/GB99/03085	International filing date (day/month/year) 14 September 1999 (14.09.99)

1. The following indications appeared on record concerning:		
<input type="checkbox"/> the applicant	<input type="checkbox"/> the inventor	<input checked="" type="checkbox"/> the agent
<input type="checkbox"/> the common representative		
Name and Address PHILLIPS & LEIGH 7 Staple Inn Holborn London WC1V 7QF United Kingdom	State of Nationality	State of Residence
	Telephone No. 0171 405 0133	
	Facsimile No. 0171 242 2008	
	Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:		
<input type="checkbox"/> the person	<input type="checkbox"/> the name	<input checked="" type="checkbox"/> the address
<input type="checkbox"/> the nationality		
<input type="checkbox"/> the residence		
Name and Address PHILLIPS & LEIGH 5 Pemberton Row London EC4A 3BA United Kingdom	State of Nationality	State of Residence
	Telephone No. 4420 7822 8888	
	Facsimile No. 4420 7822 8899	
	Teleprinter No.	
3. Further observations, if necessary:		
4. A copy of this notification has been sent to:		
<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned	
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned	
<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:	

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer  S. Cruz
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PCT

NOTICE INFORMING THE APPLICANT OF THE  
COMMUNICATION OF THE INTERNATIONAL  
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

PHILLIPS & LEIGH  
7 Staple Inn  
Holborn  
London WC1V 7QF  
ROYAUME-UNI

RECEIVED

31 MAR 2000 42

PHILLIPS &amp; LEIGH

JB

Date of mailing (day/month/year) 23 March 2000 (23.03.00)		
Applicant's or agent's file reference FP-08-0932		
IMPORTANT NOTICE		
International application No. PCT/GB99/03085	International filing date (day/month/year) 14 September 1999 (14.09.99)	Priority date (day/month/year) 15 September 1998 (15.09.98)
Applicant THE MORGAN CRUCIBLE COMPANY PLC et al		

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

AU,CN,JP,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CR,CU,CZ,DE,DK,DM,EA,EE,EP,ES,FI,GB,GD,GE,  
GH,GM,HR,HU,ID,IL,IN,IS,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MD,MG,MK,MN,MW,MX,NO,NZ,OA,  
PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on  
23 March 2000 (23.03.00) under No. WO 00/15574

## REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

## REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer  J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>FP-08-0932</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 99/ 03085</b>	International filing date (day/month/year) <b>14/09/1999</b>	(Earliest) Priority Date (day/month/year) <b>15/09/1998</b>
Applicant <b>THE MORGAN CRUCIBLE COMPANY PLC et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

### 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

### 4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

### 5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

### 6. The figure of the drawings to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

T/GB 99/03085

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C04B28/24 C04B30/02 //(C04B28/24,14:46)

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C04B C03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 835 054 A (OLEWINSKI E ET AL) 10 September 1974 (1974-09-10) the whole document ----	1,12,15
A	EP 0 710 628 A (MORGAN CRUCIBLE CO) 8 May 1996 (1996-05-08) ----	1
A	& WO 94 15883 A21 July 1994 (1994-07-21) cited in the application ----	1
A	WO 97 20782 A (OWENS CORNING FIBERGLASS CORP ;RAPP CHARLES FREDERICK (US); STRAUS) 12 June 1997 (1997-06-12) page 10, line 23 -page 11, line 20; claim 1 ----	1,5,12
A	US 4 430 369 A (PAYNE CHARLES C) 7 February 1984 (1984-02-07) the whole document ----- -/--	1,12



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

22 December 1999

Date of mailing of the international search report

11/01/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Theodoridou, E

## INTERNATIONAL SEARCH REPORT

International Application No

T/GB 99/03085

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 1 204 472 A (FOSECO TRADING AG) 9 September 1970 (1970-09-09) claims -----	1,5-8,12

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/03085

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3835054	A	10-09-1974	NONE	
EP 0710628	A	08-05-1996	WO 9315028 A	05-08-1993
			AT 136874 T	15-05-1996
			AU 663155 B	28-09-1995
			AU 3358493 A	01-09-1993
			AU 690864 B	30-04-1998
			AU 4508197 A	05-02-1998
			AU 686594 B	12-02-1998
			AU 5837494 A	15-08-1994
			BR 9305741 A	28-01-1997
			BR 9406117 A	19-03-1996
			CA 2154442 A	21-07-1994
			CN 1116422 A, B	07-02-1996
			CZ 9501836 A	15-05-1996
			DE 69400154 D	23-05-1996
			DE 69400154 T	28-11-1996
			DK 679145 T	12-08-1996
			EP 0621858 A	02-11-1994
			EP 0679145 A	02-11-1995
			ES 2086248 T	16-06-1996
			FI 943380 A	14-09-1994
			WO 9415883 A	21-07-1994
			GB 2277516 A, B	02-11-1994
			GB 2289673 A, B	29-11-1995
			HK 1001474 A	19-06-1998
			HK 1001475 A	19-06-1998
			JP 7502969 T	30-03-1995
			JP 8506561 T	16-07-1996
			NO 942655 A	14-07-1994
			PL 309954 A	13-11-1995
			SK 85694 A	05-01-1995
			ZA 9400236 A	22-08-1994
			US 5811360 A	22-09-1998
			US 5955389 A	21-09-1999
WO 9720782	A	12-06-1997	US 5658836 A	19-08-1997
			AU 697808 B	15-10-1998
			AU 1409097 A	27-06-1997
			CA 2238863 A	12-06-1997
			CN 1203569 A	30-12-1998
			EP 0865414 A	23-09-1998
			NO 982530 A	03-08-1998
			US 5968648 A	19-10-1999
US 4430369	A	07-02-1984	NONE	
GB 1204472	A	09-09-1970	NONE	

CLAIMS

5

1. A composite material comprising colloidal silica-bonded alkaline earth silicate fibres in which any bonding agents or fillers comprise low amounts of aluminium so that the composite material comprises less than 1% by weight aluminium expressed as  $Al_2O_3$ .

10

2. A composite material as claimed in claim 1 in which composite material comprises less than 0.5% by weight by weight of aluminium expressed as  $Al_2O_3$ .

3. A composite material as claimed in claim 2 in which the composite material comprises less than 0.1% by weight by weight of aluminium expressed as  $Al_2O_3$ .

15

4. A composite material as claimed in claim 1 in which the composite material is essentially free of aluminium.

20

5. A composite material as claimed in any preceding claim and comprising less than 1% by weight sodium expressed as  $Na_2O$ .

6. A composite material as claimed in claim 5 and comprising less than 0.5% by weight sodium expressed as  $Na_2O$ .

25

7. A composite material as claimed in claim 6 and comprising less than 0.1% by weight sodium expressed as  $Na_2O$ .

8. A composite material as claimed in any preceding claim and in which the composite material is essentially free of sodium.

30

9. A composite material as claimed in any preceding claim and comprising less than 0.5% by weight boron expressed as  $B_2O_3$ .



10. A composite material as claimed in claim 9 and comprising less than 0.1% by weight boron expressed as  $B_2O_3$ .

5 11. A composite material as claimed in any preceding claim in which the alkaline earth silicate fibre is itself capable of use without excessive shrinkage at temperatures in excess of 1200°C.

10 12. A composite material as claimed in any preceding claim in which the material is obtainable by vacuum forming from a slurry containing the following ingredients (in weight %):-

Alkaline earth metal silicate fibre	70-85%
Colloidal silica (30% $SiO_2$ by weight)	3-25%
Organic binder	1-6%
Filler	11-20%

15 13. A composite material as claimed in claim 12 comprising:-

Alkaline earth metal silicate fibre	70-90%
Colloidal silica (30% $SiO_2$ by weight)	1-10%
Organic binder	1-6%
Filler	11-20%

20 14. A composite material as claimed in claim 13 comprising:-

Alkaline earth metal silicate fibre	77.3-87.2%
Colloidal silica (30% $SiO_2$ by weight)	1.2-8.2%
Organic binder	3.3-4.7%
Filler	12.8-18%

25 15. A composite material as claimed in any of claims 1 to 11 in which the material is a paper comprising:-

Alkaline earth metal silicate fibre	90-95%
Organic binder	5-10%
Organic flocculants	<1%

16. A composite material as claimed in claim 15 in which the organic binder is an acrylic latex.
17. A composite material as claimed in any of claims 1 to 11 in which the material is a material obtainable by vacuum forming from a slurry comprising the ingredients:
- 5
- |                                                 |                         |
|-------------------------------------------------|-------------------------|
| Alkaline earth silicate fibre                   | 60 parts by weight      |
| Colloidal silica (30%by weight $\text{SiO}_2$ ) | 12 - 14 parts by weight |
| Starch                                          | 2.5 parts by weight     |
- and in which the colloidal silica has a pH of less than 8.
18. A composite material comprising 4-12% by weight colloidal silica, 3-6.5% starch, balance to 100% alkaline earth silicate fibre.
- 10
19. A composite material as claimed in claim 18 and comprising 4-9% by weight colloidal silica, 3.5-5% starch, balance to 100% alkaline earth silicate fibre.
- 15
20. A composite material as claimed in claim 18 comprising about 6% colloidal silica.
21. A composite material as claimed in any of claims 1 to 11 in which the material is a material obtainable by vacuum forming from the ingredients:-
- |                                     |                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------|
| "White water" component             | 50-80% by volume of 30% solids colloidal silica with 20-50% by volume mains water |
| Alkaline earth metal silicate fibre | 0.5-4% by weight of solids to white water component                               |
- 20
- and in which the colloidal silica has a pH of less than 8.

22. A composite material as claimed in any of claims 1 to 11 in which the material is a material obtainable by vacuum forming from the ingredients:-

"White water"	90-100% by volume of 30% solids colloidal silica
component	with 10-0% by volume mains water
Alkaline earth metal	2-3% by weight of solids to white water
silicate fibre	component

and in which the colloidal silica has a pH of less than 8.

5

23. A composite material as claimed in claim 21 or claim 22 and which comprises 15-30% by weight colloidal silica, balance fibre.

24. A composite material as claimed in claim 17 in which the fibre is present in amounts comprising 0.5-5% by weight of the water in the slurry.

10

25. A composite material as claimed in any of claims 1 to 11 in which the material is a material obtainable by vacuum forming from the ingredients

"White water"	65-100% by volume of 40% solids low sodium
component	content colloidal silica having a pH of less than
	10 with 35%-0% by volume mains water
Alkaline earth metal	2-3wt% by weight of solids to white water
silicate fibres	component

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

PHILLIPS & LEIGH  
5 Pemberton Row  
London EC4A 3BA  
GRANDE BRETAGNE

## PCT

### NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

Date of mailing  
(day/month/year) 23.10.2000

Applicant's or agent's file reference  
FP-08-0932

#### IMPORTANT NOTIFICATION

International application No.  
PCT/GB99/03085

International filing date (day/month/year)  
14/09/1999

Priority date (day/month/year)  
15/09/1998

Applicant  
THE MORGAN CRUCIBLE COMPANY PLC et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

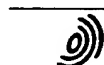
#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office  
D-80298 Munich  
Tel. +49 89 2399 - 0 Tx: 523656 epmu d  
Fax: +49 89 2399 - 4465

Authorized officer

Koutsoftas, P

Tel. +49 89 2399-7273



# ATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference FP-08-0932		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/03085	International filing date (day/month/year) 14/09/1999	Priority date (day/month/year) 15/09/1998	
International Patent Classification (IPC) or national classification and IPC C04B28/24			
Applicant THE MORGAN CRUCIBLE COMPANY PLC et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  28/01/2000	Date of completion of this report  23.10.2000
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Fortunati, T  Telephone No. +49 89 2399 8561  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB99/03085

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-13 as originally filed

**Claims, No.:**

1-25 as amended under Article 19

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	1-25
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-25
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-25
	No:	Claims	

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB99/03085

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**2. Citations and explanations**

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/GB99/03085

1) Reference is made to the following documents:

D1: US 3 835 054 A (OLEWINSKI E ET AL) 10 September 1974 (1974-09-10)

D2: EP 0 710 628 A (MORGAN CRUCIBLE CO) 8 May 1996 (1996-05-08) & WO 94 15883 A21 July 1994 (1994-07-21)

D3: WO 97 20782 A (OWENS CORNING FIBERGLASS CORP ; RAPP CHARLES FREDERICK (US); STRAUS) 12 June 1997 (1997-06-12)

2) Regarding Section V:

2.1) The present report is based on the set of claims 1 to 25 as amended under Art. 19.

2.2) D1 refers to aluminosilicate fibres. D1 does not refer to alkaline earth silicate fibres. The document D2 is concerned with fibres compositions. This document is silent about the aluminium content of any bonding agents or fillers and does not disclose colloidal silica bonded materials. Document D3 is directed to coated mineral fibres which are alkaline earth metal silicate fibres. As mentioned at page 10 at lines 20 to 22 of document D3 the coatings can include aluminium phosphate. None of the exemplified fibres of D3 has the low alumina content presently claimed. The problem to be solved by the present invention is to find a binding system that does not react adversely with alkaline earth silicate fibres. The solution of this problem is the recognition that the adverse effects are due to the presence of aluminium in the binder and fillers conventionally used with RCF. The documents D1 to D3 do not lead the man skilled in the art to investigate the content of aluminium so that the binding system does not react adversely with alkaline earth silicate fibres. As a consequence, novelty and inventive step are acknowledged.



CLAIMS

5

1. A composite material comprising colloidal silica-bonded alkaline earth silicate fibres in which any bonding agents or fillers comprise low amounts of aluminium so that the composite material comprises less than 1% by weight aluminium expressed as  $\text{Al}_2\text{O}_3$ .

10

2. A composite material as claimed in claim 1 in which composite material comprises less than 0.5% by weight by weight of aluminium expressed as  $\text{Al}_2\text{O}_3$ .

3. A composite material as claimed in claim 2 in which the composite material comprises less than 0.1% by weight by weight of aluminium expressed as  $\text{Al}_2\text{O}_3$ .

15

4. A composite material as claimed in claim 1 in which the composite material is essentially free of aluminium.

20

5. A composite material as claimed in any preceding claim and comprising less than 1% by weight sodium expressed as  $\text{Na}_2\text{O}$ .

6. A composite material as claimed in claim 5 and comprising less than 0.5% by weight sodium expressed as  $\text{Na}_2\text{O}$ .

25

7. A composite material as claimed in claim 6 and comprising less than 0.1% by weight sodium expressed as  $\text{Na}_2\text{O}$ .

8. A composite material as claimed in any preceding claim and in which the composite material is essentially free of sodium.

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9. A composite material as claimed in any preceding claim and comprising less than 0.5% by weight boron expressed as  $\text{B}_2\text{O}_3$ .

10. A composite material as claimed in claim 9 and comprising less than 0.1% by weight boron expressed as  $B_2O_3$ .

11. A composite material as claimed in any preceding claim in which the alkaline earth silicate fibre is itself capable of use without excessive shrinkage at temperatures in excess of  $1200^{\circ}C$ .

12. A composite material as claimed in any preceding claim in which the material is obtainable by vacuum forming from a slurry containing the following ingredients (in weight %):-

Alkaline earth metal silicate fibre	70-85%
Colloidal silica (30% $SiO_2$ by weight)	3-25%
Organic binder	1-6%
Filler	11-20%

13. A composite material as claimed in claim 12 comprising:-

Alkaline earth metal silicate fibre	70-90%
Colloidal silica (30% $SiO_2$ by weight)	1-10%
Organic binder	1-6%
Filler	11-20%

14. A composite material as claimed in claim 13 comprising:-

Alkaline earth metal silicate fibre	77.3-87.2%
Colloidal silica (30% $SiO_2$ by weight)	1.2-8.2%
Organic binder	3.3-4.7%
Filler	12.8-18%

15. A composite material as claimed in any of claims 1 to 11 in which the material is a paper comprising:-

Alkaline earth metal silicate fibre	90-95%
Organic binder	5-10%
Organic flocculants	<1%

16. A composite material as claimed in claim 15 in which the organic binder is an acrylic latex.
17. A composite material as claimed in any of claims 1 to 11 in which the material is a material obtainable by vacuum forming from a slurry comprising the ingredients:
- 5
- |                                                  |                         |
|--------------------------------------------------|-------------------------|
| Alkaline earth silicate fibre                    | 60 parts by weight      |
| Colloidal silica (30% by weight $\text{SiO}_2$ ) | 12 - 14 parts by weight |
| Starch                                           | 2.5 parts by weight     |
- and in which the colloidal silica has a pH of less than 8.
18. A composite material comprising 4-12% by weight colloidal silica, 3-6.5% starch, balance to 100% alkaline earth silicate fibre.
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19. A composite material as claimed in claim 18 and comprising 4-9% by weight colloidal silica, 3.5-5% starch, balance to 100% alkaline earth silicate fibre.
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20. A composite material as claimed in claim 18 comprising about 6% colloidal silica.
21. A composite material as claimed in any of claims 1 to 11 in which the material is a material obtainable by vacuum forming from the ingredients:-
- |                                               |                                                                                   |
|-----------------------------------------------|-----------------------------------------------------------------------------------|
| "White water" component                       | 50-80% by volume of 30% solids colloidal silica with 20-50% by volume mains water |
| Alkaline earth metal silicate fibre component | 0.5-4% by weight of solids to white water component                               |
- 20
- and in which the colloidal silica has a pH of less than 8.

22. A composite material as claimed in any of claims 1 to 11 in which the material is a material obtainable by vacuum forming from the ingredients:-

"White water"	90-100% by volume of 30% solids colloidal silica
component	with 10-0% by volume mains water
Alkaline earth metal	2-3% by weight of solids to white water
silicate fibre	component

and in which the colloidal silica has a pH of less than 8.

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23. A composite material as claimed in claim 21 or claim 22 and which comprises 15-30% by weight colloidal silica, balance fibre.

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24. A composite material as claimed in claim 17 in which the fibre is present in amounts comprising 0.5-5% by weight of the water in the slurry.

25. A composite material as claimed in any of claims 1 to 11 in which the material is a material obtainable by vacuum forming from the ingredients

"White water"	65-100% by volume of 40% solids low sodium
component	content colloidal silica having a pH of less than
	10 with 35%-0% by volume mains water
Alkaline earth metal	2-3wt% by weight of solids to white water
silicate fibres	component